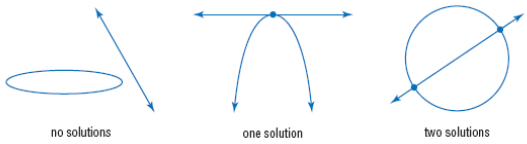
8-7 Solving Quadratic Systems

Line and quadratic 0 - 2 solutions

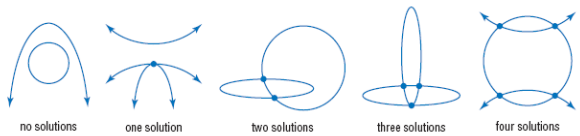
Quadratic and quadratic

0 - 4 solutions

SYSTEMS OF QUADRATIC EQUATIONS If the graphs of a system of equations are a conic section and a line, the system may have zero, one, or two solutions. Some of the possible situations are shown below.



If the graphs of a system of equations are two conic sections, the system may have zero, one, two, three, or four solutions. Some of the possible situations are shown below.



Solve.

$4x^2 + y^2 = 25$ ellipse

$2x + y = -1$ line

$y = -1 - 2x$

$4x^2 + (-1-2x)^2 = 25$

$4x^2 + 1 + 4x + 4x^2 = 25$

$8x^2 + 4x - 24 = 0$

$2x^2 + x - 6 = 0$

$2x^2 + 4x - 3x - 6 = 0$

$2x(x+2) - 3(x+2) = 0$

$(2x-3)(x+2) = 0$

$x = \frac{3}{2}$ $x = -2$

$\left(\frac{3}{2}, -4\right)$ $(-2, 3)$

Plug back into line equation if you have a line

$y = -1 - 2x$

Solve.
$x^2 - 3y^2 = 8$ hyp.
$x - y = 2$ line

$x - 2 = y$

$x^2 - 3(x-2)^2 = 8$

$x^2 - 3(x^2 - 4x + 4) = 8$

$x^2 - 3x^2 + 12x - 12 = 8$

$-2x^2 + 12x - 20 = 0$

$x^2 - 6x + 10 = 0$

$x = \frac{6 \pm \sqrt{36 - 4(1)(10)}}{2}$ No IR soln

Solve.
$x^2 + 2y^2 = 23$ ellipse
$(2x^2 - y^2 = 1)^2$ hyp.

$x^2 + 2y^2 = 23$

$4x^2 - 2y^2 = 2$

$5x^2 = 25$

$x^2 = 5$

$x = \pm\sqrt{5}$

$(\sqrt{5}, 3)\ (\sqrt{5}, -3)$
$(-\sqrt{5}, 3)\ (-\sqrt{5}, -3)$

$(\sqrt{5})^2 + 2y^2 = 23$

$2y^2 = 18$

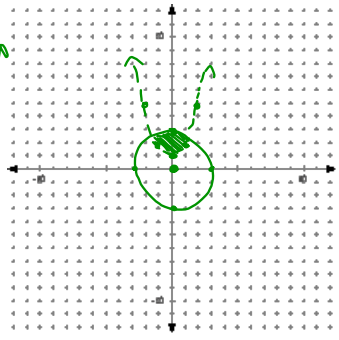
$y^2 = 9$

$y = \pm 3$

$(\pm\sqrt{5}, \pm 3)$

Solve.
$x^2 + y^2 = 25$
$2x^2 - 3y^2 = 30$

Solving systems of Inequalities.
$x^2 + y^2 \leq 9$
$y > x^2 + 1$ (>, <)



Circle
$C(0,0)$
$r = 3$

Parabola
$V(0,1)$

x	
1	2
-1	2
2	5
-2	5

Solve.

$x^2 + y^2 \leq 16$

$(x - 1)^2 + (y - 1)^2 \geq 4$

Circle 1

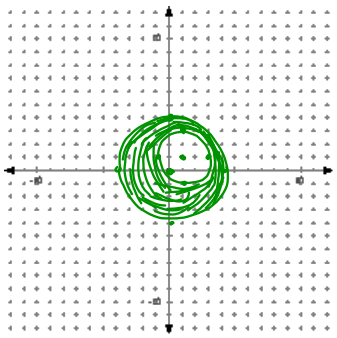
C(0,0)

r = 4

Circle 2

C(1,1)

r = 2



HW

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17, 19, 21, 24, 28, 32-34

line up